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INSIDE

Does Arizona Have Earthquakes?

Larry D. Fellows
Director and State Geologist

Does Arizona have earthquakes? Do you have a map that shows active faults? Do you have information about earthquakes in Prescott, Scottsdale, Green Valley, and Phoenix (in that order)?

More than 40 people, mostly from southern California, have called the Arizona Geological Survey (AZGS) to ask these questions since the Northridge, California, earthquake in January. The AZGS has prepared a packet of information, summarized below, to answer these questions.

What is the earthquake risk in Arizona? Assessment of earthquake risk involves evaluation of the historical record of earthquakes and the results of geologic investigations of active or potentially active faults. The historical record in Arizona was incomplete until about the 1870s. Most active faults world-wide, and all active faults in Arizona, have recurrence intervals (time between movements) that are greater than 150 years. A record of only the last 125 years may not be a true representation of the actual level of earthquake activity.

The historical record indicates that the risk from earthquakes originating within Arizona is low to moderate, and the risk posed by earthquakes adjacent to Arizona is probably greater. No deaths or personal injuries, and only relatively modest amounts of property damage have been caused by earthquakes in Arizona during the past 125 years. Many earthquakes ranging in magnitude up to about 6.0 have occurred within Arizona during historic time. Some of them caused minor damage. The largest historical earthquakes in Arizona occurred in the Flagstaff and Grand Canyon area in the early 1900s.

Arizona residents have felt strong earthquakes that were generated by the San Andreas and related faults in southern California and northern Mexico. Some of those quakes caused significant property damage in the Yuma area, which has the highest earthquake risk in Arizona. This is a major reason why the National Earthquake Hazard Reduction Program recently categorized Arizona as "high risk," their second most serious category. The

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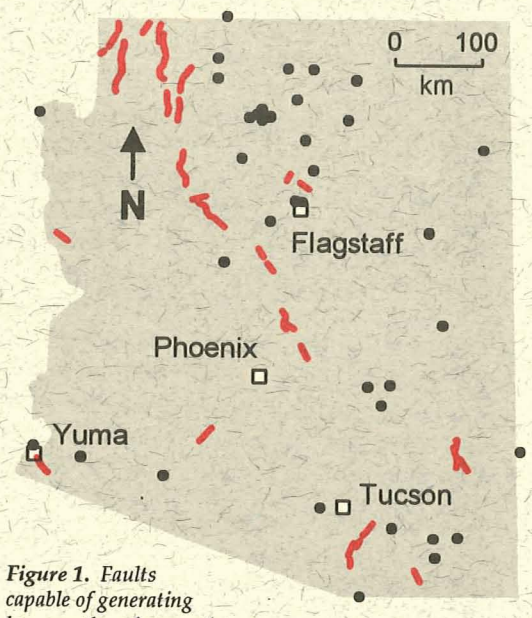

Figure 1. Faults capable of generating large earthquakes are shown as orange lines. Epicenters of moderate earthquakes (magnitude 4 to 6) that have occurred in Arizona in historic times are shown as black dots.

Earthquake Bibliography

Geologic Hazards Publications

Earthquakes, flooding, subsidence and earth fissuring, landslides, and other geologic processes may be hazardous or limit the use of Arizona's land, water, mineral, and energy resources. Those who site, design, construct, and maintain housing subdivisions, water supply and waste disposal facilities, highways, industrial complexes, and many other types of structures need to be aware of these known or potential hazards and limitations.

AZGS geologists map and characterize geologic processes and materials. Results of these studies may be used help make land- and resource-management decisions. **A list of publications on known and potential geologic hazards and limitations in Arizona is available** and may be obtained (at no cost) from the AZGS. Most of the items listed were written for geologists, hydrogeologists, hydrologists, engineers, and other professionals. Data users may obtain additional information and assistance from AZGS geologists.

The AZGS recently released **Open-File Report 94-3, Bibliography of earthquake hazards in Arizona**, which lists more than 400 publications on earthquakes and related hazards. Selected references are included that describe earthquakes in southern California and northern Mexico that have potential to impact Arizona. References are grouped into nine categories to enable users to focus on areas of specific interest.

The project was funded by the Federal Emergency Management Agency, the Earthquake Program of the Arizona Division of Emergency Management, and the AZGS. Scott Beyer, a graduate student in geology at Arizona State University, did the compilation, under the direction of Dr. Philip A. Pearthree, AZGS project manager. Information about how to order this publication is given on page 3.

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1887 earthquake, which originated in Sonora about 40 miles southeast of Douglas, Arizona, was felt throughout southern Arizona and caused some damage to buildings.

Geologic investigations of large prehistoric earthquakes (greater than magnitude 6.5) indicate that at least 23 faults in or very near Arizona have been active in the past 100,000 years. These faults have potential to generate large earthquakes, although none have occurred along them in historic times.

Even though the probability of a destructive earthquake in Arizona is fairly low, a large earthquake could happen here. As an analogy, a "100-year flood" has only a 1 percent probability of happening in any one year, but several of Arizona's large rivers have experienced more than one 100-year flood in the last 15 years.

Where can I get more information about earthquakes in Arizona? Much information about historical earthquakes and the locations and character of active or potentially active faults is available. The AZGS has published a bibliography of earthquake publications (**Open-File Report 94-3**, described in more detail above), a catalog of Arizona earthquakes, 1776-1980 (**Bulletin 193**); a special report on the 1887 earthquake (**Special Paper 3**); a map of young faults and volcanic activity (**Map 22**); and other detailed reports and maps related to potentially active faults and earthquake risk. Please contact the AZGS for additional information.

Earthquake preparedness and safety activities are handled by the Earthquake Program (EP) of the Division of Emergency Management Arizona Department of Emergency and Military Affairs, 5636 E. McDowell Road, Phoenix, AZ 85008 [telephone (602) 231-6238]. The EP and the AZGS have prepared a free brochure entitled ***Arizona Earthquakes: Are we at risk?***, which may be obtained from the EP. Reginald A. Yates, the EP Manager, can also provide the names, addresses, and telephone numbers of the principal contact persons at the Arizona Earthquake Information Center at Northern Arizona University (Flagstaff), the Southern Arizona Seismic Observatory at the University of Arizona (Tucson), and the Department of Geology at Arizona State University (Tempe).

Governor Fife Symington has supported earthquake safety and preparedness in Arizona through Executive Order 93-3, in which he established the Arizona Council for Earthquake Safety to assist in determination of policy and coordination of government programs and activities with those in the private sector.